GOVERNMENT OF KARNATAKA
KARNATAKA SCHOOL EXAMINATION AND ASSESEMENT BOARD
MODEL QUESTION PAPER - 1 (2024 - 25)
II PU SUBJECT – BIOLOGY (36)

Duration: 3hr **Max. Marks: 70**

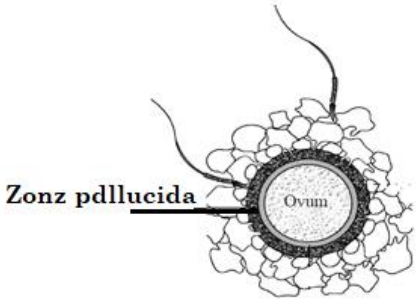
General Instruction:

- **This Question paper consists of parts A, B, C, D and E**
- **Part – A consists of I and II and Part D consists of V and VI**
- **All the parts are compulsory**
- **The answers for Part – A, written in the first two pages of the answer booklet are only considered for evaluation**
- **Part – E consists of questions for visually challenged students only**

PART – A

I. Select the correct alternative from the choices given below: **15 x 1 = 15**

1. Statement I: Apomixis is the production of seeds from unfertilized ovules
   Statement II: Embryos produced from apomictic seeds are not generally identical to the parent plant.
   a) Statement I is true, statement II is false
   b) Statement I is false, statement II is true
   c) Statement I and statement II both are true
   d) Statement I and statement II both are false
2. Choose the correct option from the table given below for the formation and dissolution of the labeled part in the given diagram.



	Formed by	Dissolved
a)	Primary oocyte	before fertilisation
b)	Primary oocyte	after fertilisation
c)	Secondary oocyte	before fertilisation
d)	Secondary oocyte	after fertilisation

3. Out of the options given below choose the correct stage for transfer to the fallopian tube for successful IVF results.
   a) Embryo up to 8 blastomeres
   b) embryo up to 16 blastomeres
   c) Embryo up to 32 blastomeres
   d) Embryo up to 32 blastomeres
4. 37.2% recombinant *Drosophila* progeny obtained in the T. H. Morgan's dihybrid cross experiment with the phenotypes red eye color, normal body and white eye color, miniature body is due to;
   a) Loosely linked and shorter distance between genes
   b) Tightly linked and shorter distance between genes
   c) Loosely linked and longer distance between genes
   d) Tightly linked and longer distance between genes

5. The number of nucleotide pairs present in the DNA of the primary oocyte of a new born in human
   a) 3.3×10^9 b) 6.6×10^9 c) 13.2×10^9 d) 3.3×10^7
6. The factors that affect Hardy – Weinberg equilibrium are listed below;
   i) Crossing over, Independent assortment
   ii) Crossing over, Mutation,
   iii) Genetic drift, Crossing over
   iv) Independent assortment, Mutation
   Choose the correct options:
   a) i, ii and iii b) ii, iii and iv c) i, iii and iv d) i, ii, iii and iv
7. Interferons are most effective in making non-infected cells resistant against the spread of which of the following diseases in humans?
   a) AIDS b) Ascariasis c) Ringworm d) Amoebiasis
8. The human host cells in which the gametocytes of malarial parasite develop are
   a) Thrombocytes b) Liver cells c) Erythrocytes d) Leucocytes
9. Which of the following water samples in the table given below will have a higher concentration of organic matter?

Water Sample	Level of pollution	Value of BOD
a)	High	High
b)	Low	Low
c)	Low	High
d)	High	Low

10. The steps of Recombinant DNA technology are given below:
    i) Insertion of recombinant DNA into the host organism
    ii) Amplification of gene of interest using PCR
    iii) Cutting of DNA at specific locations
    iv) Obtaining the foreign product
    v) Downstream processing
    vi) Isolation of DNA
    Choose the correct option for the sequential steps of Recombinant DNA technology.
    a) vi, ii, iii, iv, v, i b) vi, i, iii, iv, v, ii c) vi, ii, iii, iv, v, i d) vi, iii ii, i, iv,, v,
11. DNA in a clone of cells followed by detection using autoradiography is called
    a) Template b) Probe c) Transcript d) Cistron
12. Jeeva was growing a bacterial colony in a culture flask under ideal laboratory conditions where the resources sooner or later become limiting. Which of the following equations will represents the correct growth in this case?
    a) $dN/dt = rN$ b) $dN/dt = KN$ c) $dN/dt = rN (K - N/K)$ d) $dN/dt = rN (K + N/K)$
13. Which of the following food chains is the major conduit for the energy flow in terrestrial and aquatic ecosystems respectively?

	Terrestrial	Aquatic
a)	Grazing	Grazing
b)	Detritus	Detritus
c)	Detritus	Grazing
d)	Grazing	Detritus

14. Which of the following is not an example of *in-situ* conservation?
    a) National park and seed bank

b) National park and Zoological parks
c) Seed bank and sacred groove
d) Seed bank and Botanical gardens

15. Exploration of molecular, genetic and species level diversity for novel products of economic importance is
    a) Biofortification b) Bioprocessing c) Bioprospecting d) Biodiversity

II. Fill in the blanks by choosing the appropriate word/Words from those given below: 5 x 1 = 5

(Competent cells, Bacteria, non-living molecule, vectors, Competent cells, Recombinant cells)

16. The interstitial space in seminiferous tubules consists of immunologically ----------
17. The version of biogenesis is accepted by majority, as the first form of life arose slowly through evolutionary forces from ----------.
18. Filariasis pathogens are transmitted to a healthy person through ----------
19. Swiss cheese with large holes is produced from ----------
20. The host cells which have the ability to incorporate foreign DNA within them are called ----------

PART - B

III. Answer any FIVE of the following questions in 3 – 5 sentences wherever applicable: 5 x 2 = 10

21. Complete the tabular column given below with respect to the male gametophyte of angiosperms

Cells of the male gametophyte		
Shape of nucleus of the cells		

22. Mention the two medical grounds on which the pregnancies are subjected to termination.
23. Derive the phenotypic and genotypic ratio of a cross between AB blood group parents.
24. Which sequences of bases transcribed from DNA are found both in hnRNA and mRNA?
25. "Potato tubers and Sweet potato tubers are the result of convergent evolution". Justify the statement.
26. What are biofertilizers? Mention its significance.
27. Name any four recent extinct organisms as per IUCN Red list.

PART - C

IV. Answer any FIVE of the following questions in 40 – 80 words each wherever applicable: 5 x 3 = 15

28. Draw a labeled diagram of the fertilised female gametophyte and mention the ploidy of any one of the products of double fertilization.
29. Parturition is induced by complex neuroendocrine mechanism. Comment.
30. The popular and effective contraceptives include IUDs. Mention the types of IUDs with an example of each.
31. Write the salient feature of the following human ancestors;
    i) Dryopithecus ii) Ramapithecus iii) Australopithecus iv) *Homo habilis*
    v) Neanderthal man vi) *Homo erectus*
32. Describe any three properties of Cancerous cells.
33. Complete the below given tabular column with appropriate answers.

Name of the Microbe	Name of the Product	Uses
A	Lactic acid	B
Methanogens	C	D
E	F	Treatment of bacterial diseases

34. Represent diagrammatically the pyramid of number in a Terrestrial ecosystem.

PART – D

V. Answer any FOUR of the following questions in about 200–250 words each wherever applicable: 4x5 = 20

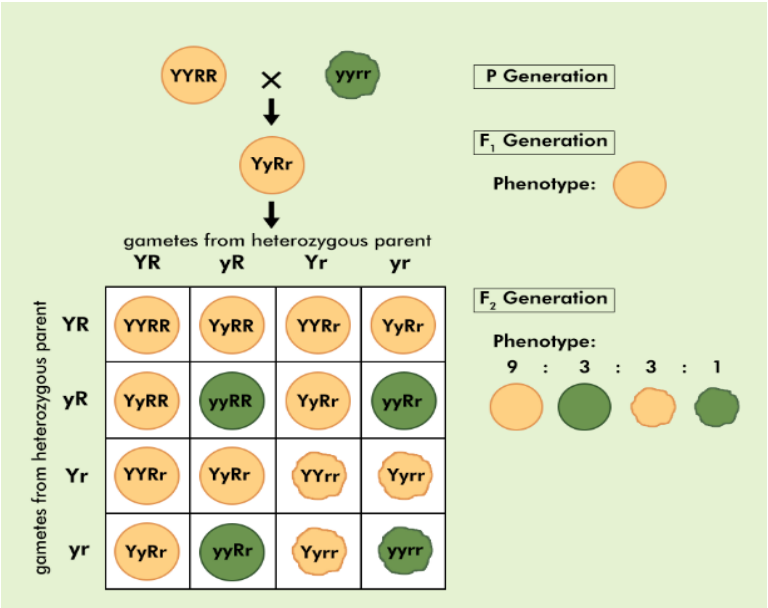
35. Flowering plants have developed many devices to discourage self-pollination and encourage cross-pollination. Comment.
36. Draw a labeled diagrammatic sectional view of the human female reproductive system.
37. Few autosome linked recessive gene blood diseases occur in human population. Among them some are related to qualitative and quantitative problem of synthesizing blood proteins. Explain.
38. DNA replication is fast, accurate, energetically expensive, substrate and enzyme dependent, initiated from specific site and cannot uncoil on its entire length. Explain the process of DNA replication considering all these features.
39. Some drug bottles had their name labels missing in a drug store of a hospital. The staff needs to identify the drugs with their actions still written on them. Analyse their actions listed below and identify the name of each drug and also the source of each one of them.

DRUG	EFFECT
Drug 1	Used by doctors as sedative and pain killer
Drug 2	Help patients to cope with insomnia and depression
Drug 3	Increases blood pressure and heart rate of consumer
Drug 4	Act as depressant and slows down body functions
Drug 5	Affects cardiovascular system of the body

40. Transgenic animals provide innumerable benefits to human beings. Justify the statement with common reasons.
41. Explain the fascinating forms of interactions in;
    a) Brood parasitism (3M)
    b) Sexual deceit (2M)

VI. Answer any ONE of the following questions in about 200–250 words each wherever applicable: 1 x 5= 5

42. Results of a Mendelian dihybrid cross are represented in the form of Punnett square.



Answer the following questions with respect to the results of a dihybrid cross.

a) Number of parental types progeny
b) Number of recombinant progeny
c) Number of homozygous recessive progeny

d) Number of homozygous dominant progeny
e) Number of homozygous progeny for both the traits
f) Number of heterozygous progeny for both the traits
g) Number of pure line progeny
h) Number of homozygous progeny for single trait
i) Number of heterozygous progeny for single trait
j) Number of recessive progeny for single trait

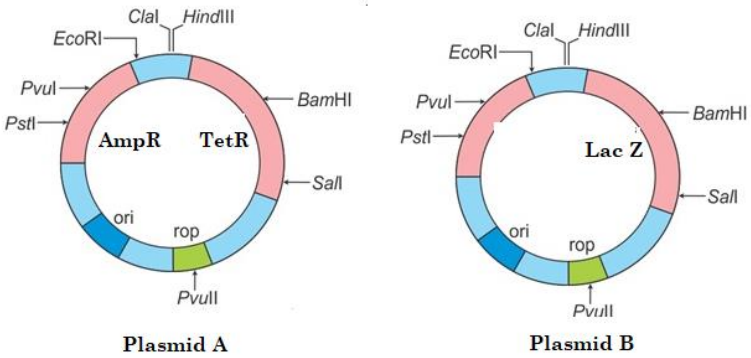
43. Given below are sequences of nucleotides in a particular mRNA and amino acids coded by it;

5'- AUG UUU UUC GAG UUA GUG UAA-3'

met phe phe glu leu val

Write the properties of genetic code that can be correlated from the above given data

44. Given below are the diagrams of plasmids A and B, observe meticulously and answer the questions that follows;



a) Which plasmid is/are you select for cloning and why? (1M)

b) What is insertional inactivation? (1M)

c) Will the number of culture plating you should make is same or different to select recombinant if insertional inactivation is possible. Comment (3M)

PART – E

(FOR VISUALLY CHALLENGED STUDENTS ONLY)

2. Choose the correct option for the formation and dissolution of the zona pellucida.

	Formed by	Dissolved
a)	Primary oocyte	before fertilisation
b)	Primary oocyte	after fertilisation
c)	Secondary oocyte	before fertilisation
d)	Secondary oocyte	after fertilisation

42. Represent schematically the results of incomplete dominance in snapdragon plant taking the flower color character.

44. a) Mention the tools of genetic engineering. (2M)

b) What is insertional inactivation? Mention its significance. (2M)

c) What is a recombinant protein? (1M)

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